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U. S. Department of Agriculture, Forest Service

FOREST PRODUCTS LABORATORY

In cooperation with the University of Wisconsin

MADISON, WISCONSIN

List of Publications on

MECHANICAL PROPERTIES OF TIMBER

Approved Copy Filed
December, 1923

LISTS OF PUBLICATIONS OF THE FOREST PRODUCTS LABORATORY

Timber Mechanics

This list includes publications that give the results of research by the Forest Products Laboratory on the strength of timber and factors affecting the strength, the design of wooden articles or parts where strength or resistance to external forces is of importance.

Other lists of publications dealing with the other investigative projects of the Forest Products Laboratory are obtainable upon request. They are as follows:

Boxing and Crating

Strength and serviceability of shipping containers, methods of packing.

Derived Products

Chemical properties and uses of wood and chemical wood products, such as turpentine, alcohol, and acetic acid.

Glue, Plywood, and Coatings

Development of waterproof glues. Preparation and application of various glues. Plywood manufacturing problems. Coatings and methods of application.

Industrial Investigations

Methods and practices in the lumber producing and wood consuming industries; standard lumber grades, sizes, and nomenclature; production and use of small dimension stock; specifications for small wooden products; uses for little-used species and commercial woods; and low grade and wood waste surveys.

Pathology (In cooperation with the Bureau of Plant Industry)

Fungous diseases of trees; decay, molds, and stains in timber, in buildings, and in wood products; antiseptic properties of wood preservatives.

Preservation

Preservative materials and methods of application. Durability and service records of treated and untreated wood in various forms.

Pulp and Paper

Suitability of various woods for pulp and paper, fundamental principles underlying the pulping and bleaching processes; methods of technical control of these processes; relation of the chemical and physical properties of pulps and the relation of these properties to the paper making qualities of the pulps; waste in the industry, e.g., decay in wood and pulp, utilization of bark, white water losses, etc.

Timber Physics

Experimental and applied kiln drying, physical properties, air drying, steam bending.

Wood Technology

Identification of wood, effect on wood of turpentining and other extrinsic agencies, and structure of wood in relation to its properties.

The Forest Products Laboratory reserves the right to furnish only those publications, available for distribution, which in its judgment will furnish the information requested. Blanket requests or requests for a large number of copies of any individual article will not be filled except in unusual cases.

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LIST OF PUBLICATIONS ON THE MECHANICAL PROPERTIES OF TIMBER

TECHNICAL NOTES

(Free on application to the Forest Products Laboratory)

(Please give both title and number when ordering)

No.	Title
B-1	Three-piece Wing Beams as Strong as Solid Beams
B-4	Two Simple Tests for Inspection of Airplane Struts
B-5	Effect of Wrapping on the Strength of Airplane Struts
B-7	Wagon and Implement Poles of Pine and Fir
B-11	Method of Determining Moisture Content of Wood
B-12	Shrinkage in So-called "Compression Wood"
B-14	Method of Determining the Specific Gravity of Wood
B-15	Average Weights of Various Species of Wood
94	Suitability of Various Hickories for Vehicle Manufacture
101	Comparative Value of Timber Cut From Live and Dead Trees
119	Strength of Southern Pine and Douglas Fir Compared
131	Properties of Ordinary Wood Compared with Plywood
132	Effect of Varying the Number of Plies in Plywood
137	A Portable Electric Drier for Drying Kiln Samples
140	Stresses in Laminated Wood Construction
141	A Visual Method of Distinguishing Longleaf from Shortleaf and Loblolly Pine
147	Substitutes for Ash in Automobile Bodies
149	Strength of Screw Fastenings in Plywood
153	"Virgin Growth" and "Second Growth"
158	Lumber Value of Pine Trees not Affected by Turpentining
171	Red Hickory as Strong as White Hickory
180	Comparative Strength of Air Dried and Kiln Dried Wood
189	Difference Between Heartwood and Sapwood
200	Basic Grading Rules for Structural Timbers
201	Working Stresses for Structural Timbers

REPRINTS AND MIMEOGRAPHED REPORTS

(Free on application to the Forest Products Laboratory)

(Please give both title and number when ordering)

No.	Title
	Built-up Southern Yellow Pine Timbers Tested for Strength
	"Compression" Wood and Failure of Factory Roof-Beam
L4-48	Manufacture of Veneer
L4-543	Notes on the Manufacture of Plywood
	Results of Some Strength Tests on Wooden Poles
	Strength Tests of Screw Fastenings of Plywood
	Variation in Weight and Strength of Timber

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BULLETINS AND CIRCULARS

Some of the following publications may be purchased for the nominal prices indicated from the Superintendent of Documents, Government Printing Office, Washington, D.C. Send money order, drafts, or cash in United States money at sender's risk; stamps or personal checks are not accepted. Others marked "Supply Exhausted" at the time this list is issued can be consulted at many public libraries. In a number of cases they have been superseded by more recent publications.

	Date of issue
"Basic Grading Rules and Working Stresses for Structural Timbers" - U.S.D.A.Cir.295 - 5 cents	1923
"Recommended Minimum Requirements for Small Dwelling Construction" - Report of Building Code Committee of Department of Commerce, Washington, D.C. - 15 cents	1923
"The Relation of Specific Gravity of Wood to Its Shrinkage and Its Strength Properties", - U.S.D.A.Bul.676 - 10 cents	1919
"Lumber Used in the Manufacture of Wooden Products" - U.S.D.A.Bul.605 - 5 cents	1918
"Mechanical Properties of Woods Grown in the United States" - U.S.D.A.Bul.556 - 10 cents	1917
"Tests of Western Yellow Pine, Car Sills, Joists, and Small Clear Pieces" - U.S.D.A.Bul.497 - 5 cents	1917
"Strength Tests of Structural Timber Treated by Commercial Wood Preserving Processes", - U.S.D.A. Bul.286 - 5 cents	1915
"Tests of Rocky Mountain Woods for Telephone Poles", - U.S.D.A.Bul.67 - 5 cents	1914
"Rocky Mountain Mine Timbers", - U.S.D.A.Bul.77 - 5 cents	1914
"Tests of Wooden Barrels", - U.S.D.A.Bul.86 - 5 cents	1914

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BULLETINS AND CIRCULARS (Continued)

	Date of issue
"Mechanical Properties of Western Hemlock", F.S.Bul.115 - 15 cents	1913
"Mechanical Properties of Western Larch", F.S.Bul.122 - 10 cents	1913
"Mechanical Properties of Woods Grown in U.S." F.S.Cir.213 - 5 cents	1913
"Uses of Commercial Woods of U.S. - Beech, Birches, and Maples" - U.S.D.A.Bul.12 - 10 cents	1913
*"Tests of Structural Timbers" - F.S.Bul.108 - 20 cents	1912
"Fire-Killed Douglas Fir: A Study of Its Rate of Deterioration, Usability, and Strength" - F.S.Bul.112 - 10 cents	1912
*"Strength Values for Structural Timbers" - F.S.Cir.189 - 5 cents	1912
"Mechanical Properties of Redwood" - F.S.Cir. 193 - 5 cents	1912
*"Strength Tests of Cross-Arms for Telephone Poles" - F.S.Cir 204 - 5 cents	1912
*"Uses of Commercial Woods of U.S. - Cedars, Cypresses, and Sequoias" - F.S.Bul.95 - 10 cents	1911
*"Uses of Commercial Woods of U.S. - Pines" - F.S.Bul.99 - 15 cents	1911
*"Manufacture and Utilization of Hickory" - F.S.Cir.187 - 5 cents	1911
"Properties and Uses of Douglas Fir" - F.S. Bul.88 - 15 cents	1911
*"The Commercial Hickories" - F.S.Bul.80 - 15 cents	1910

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BULLETINS AND CIRCULARS (Continued)

	Date of issue
"Properties and Uses of Southern Pines" - F.S. Cir.164 - 5 cents	1909
*"Tests of Vehicle and Implement Woods" - F.S. Cir.142 - 5 cents	1908
*"Experiments on Strength of Treated Timber" - F.S.Cir.39 - 5 cents	1908
"Holding Force of Railroad Spikes in Wooden Ties" - F.S.Cir.46 - 5 cents	1906
*"Effect of Moisture on Strength and Stiffness of Wood" - F.S.Bul.70 - 15 cents	1906
"Red Gum, With Discussion of Mechanical Properties of Red Gum Wood" - F.S.Bul.58 - 15 cents	1905

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*Supply exhausted

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ARTICLES IN TRADE AND TECHNICAL PRESS

Copies of these articles are not available for distribution at the Forest Products Laboratory, except certain ones which are included in the list of mimeographed reports and reprints. All of these references can be consulted in the original publications.

Title	Author	Where published	Date
Built-up Southern Yellow Pine Timbers Tested for Strength	G.E.Heck	Nat'l Lumber Mfrs. Ass'n Wood Construction Service	Series E-2b
When Ice Breaks the Poles	G.E.Heck	Telephone Engineer	Feb.1923
Strength Tests of Screw Fastenings of Plywood	Grenoble,H.S.	Aviation	Feb.21,1921
Effect of Spiral Grain on the Strength of Wood	Wilson,T.R.C.	Journal of Forestry	Nov.1921
The Properties of Western Tie Woods	Hicks,P.R.	Railway Maintenance Engineer	Dec.1920
Testing Strength of Airplane Wing Ribs 55 to 96 in.	Elmendorf,A.	Automotive Industries	July 31,1919
The Mechanical Properties of Plywood	Elmendorf,A.	Veneers	Aug.1919
Pitch Pockets and Their Relation to the Inspection of Airplane Parts	Watkins,J.R.	Journal of the Franklin Institute	Aug.1919
The Antiquity of Various Iron and Wood Planking Fastenings for Wooden Ships	Armstrong,A.K.		

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Title	Author	Where published	Date
Tests on Thin Plywood as a Substitute for Linen in Aeroplane Construction	Elmendorf,A.	Aerial Age Weekly	Sept.1,1919
"Compression" Wood and Failure of Factory Roof-Beam	Heck,G.E.	Engineering News Record	Sept.11,1919
The Suitability of Various Woods for Use in Heavy Wagons	White,David G.	Southern Lumberman	Dec.20,1919
Fourth Progress Report on Tests of Treated Ties		American Ry.Eng.and Maintenance of Way Ass'n Bul.124	
Splintering Properties of Airplane Woods	Heck,G.E.	Automotive Industries	June 5,1919
Emergency Seasoning of Sitka Spruce	Welo,L.A.	Scientific American Supplement No.2269	June 28,1919
A Discussion of the Effects of Kiln Drying on the Strength Value of Douglas Fir	Plaskett,C.A.	American Lumberman	July 5,1919
Mechanical Test Made on Plywood	Markwardt,L.J. & Elmendorf,A.	Hardwood Record	July 10,1919
Factors Affecting Warping of Plywood	Elmendorf,A.	Hardwood Record	July 25,1919
Tests Made to Determine Lateral Resistance of Wire Nails	Wilson,T.R.C.	Engineering Record	Feb.24,1917
Variation in Weight and Strength of Timber	Newlin,J.A.	American Lumberman Southern Lumberman Lumber World Review St.Louis Lumberman Miss.Valley Lumberman	Jan.22,1916 Jan.22,1916 Jan.25,1916 Jan.1916 1916

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Title	Author	Where published	Date
Greenheart	Armstrong, A.K.	Engineering Record	Jan.29 and Feb.5,1916
Strength Tests of Structural Timbers Treated by Commercial Wood Preserving Processes	Betts, H.S. and Newlin, J.A.	Railway Review	Feb.19,1916
The Need of a Quality Classification for Douglas Fir	Newlin, J.A.	Proc.of the 19th Annual Meeting of the Amer.Soc.for Testing Materials	June 27,1916
The Important Piling Timbers of Australasia	Armstrong, A.K.	Engineering	Nov.17,1916
Grading Rules of Yellow Pine Structural Timber Discussed	Betts, H.S.	American Lumberman	Apr.24,1915
Discussion of proposed Forest Service Rules for Grading Strength of Southern Pine Structural Timber	Betts, H.S.	Proc.of the 18th Annual Meeting of the Amer.Soc.for Testing Materials	June 26,1915
Structural Timber in the U.S.	Betts, H.S. and Greeley, W.B.	International Eng. Cong., SanFran.Cal.	Sept.20-25, 1915
A Few Deductions from Strength Tests of American Woods	Newlin, J.A.	American Lumberman	Jan.16,1915
What Determines the Strength of Southern Yellow Pine	Weiss, H.F.	American Lumberman	Mar.13,1915
Effect of Different Methods of Drying on the Strength of Wood	Tiemann, H.D.	Lumber World Review	Apr.10,1915

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Title	Author	Where published	Date
The Protection of Ties from Mechanical Destruction	Weiss,H.F.	Proc.American Wood Preservers' Ass'n	Jan.1914
Factors Affecting Structural Timbers	Betts,H.S.	Engineering Record	Aug.29,1914
Applicability of Yellow Pine Grading Rules to Other Timbers	Newlin,J.A.	Engineering Record	Oct.3,1914
Compression Failures as Defects	Markwardt,L.J.	Hardwood Record	Oct.25,1914
Air Seasoning of Timber	Kempfer,W.H.	Amer.Ry.Eng.Ass'n Bulletin 161	Nov.1913

Reports of the
National Advisory Committee for Aeronautics

Copies of the following reports will be sent free upon application to National Advisory Committee for Aeronautics, Washington, D.C.

"The Effect of Kiln Drying on the Strength of Airplane Woods" - Report No.68.

"Data on the Design of Plywood for Aircraft" - Report No.84.

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